

POSTNIKOV, L.V.; LYAPUKHOV, V.Ye.

Design of a transistorized voltage stabilizer. Izv. vys. ucheb.
zav.; radiofiz. 6 no.4:840-847 '63. (MIRA 16:12)

1. Nauchno-issledovatel'skiy fiziko-tekhnicheskii 'nstitut pri
Gor'kovskom universitete.

1. Lyapundy, B. Eng.

2. USSR (600)

4. Machinery in Industry

7. First completely mechanized plant. Tekh.molod 20 no. 10, 1952

9. Monthly List of Russian Accessions, Library of Congress, February 1953. Unclassified.

LYAPUNOV, A., agronom

What we gained from using microelements and bacterial fertilizers.
Nauka i pered. op v sel'khoz 9 no.5:19-20 My '59.
(MIRA 12:8)

1. Kolkhoz "Belyayevskiy," Gor'kovskaya oblast'.
(Trace elements) (Soil inoculation)

LYAPUNOV, A. A.

- O Otkelivosti Analiticheskikh Mnozhestv. DAN, 2 (1934), 276-280
Sur la Separabilite Multiple des ensembles Mesurables E. C. R. Soc. Sci. de Vars.,
28 (1935), 118-119.
Contribution a' L'etude de Separabilite' Multiple. Matem. SB, 1 (43), (1936).
503-510
O Nekotorykh Uniformnykh Analiticheskikh Dopolneniyakh, IAN, Ser. Matem.
(1937), 285-306.
O Podklassakh V-Mnozhestv. IAN, Ser. Matem. (1937), 419-426.
O Kratnoy Otdelivosti Dlya (A)-operatsii IAN, Ser. Matem. (1939), 539-552.
O Krainoy Otdelivosti Dlya Slozheniya i Raznitsy. DAN53 (1946), 399-402

SO: MATH

LYAPUNOV, A. A.

Lyapunov, A. A. Séparabilité multiple pour le cas des opérations δ . C. R. (Doklady) Acad. Sci. URSS (N.S.) 53, 395-398 (1946).

Consider a class \mathcal{E} of subsets of an arbitrary set. Let X_1, X_2, \dots be a sequence of sets of \mathcal{E} . If whenever $\prod X_n = 0$ there exists a sequence $\{Y_n\}$ of sets, each of which, together with its complement, belongs to \mathcal{E} , such that $X_n \subset Y_n$ and $\prod Y_n = 0$, we say that \mathcal{E} satisfies the first condition of multiple separation. If with any sequence $\{X_n\}$ there is associated a sequence of sets $\{Z_n\}$, whose complements belong to \mathcal{E} , such that $X_n - \prod_{k=1}^n X_k \subset Z_n$ and $\prod Z_n = 0$ we say that \mathcal{E} satisfies the second condition of multiple separation. The concept of multiple separation is due to P. Novikoff [same C. R. (N.S.) 4, (1934 III), 145-148 (1934)]. The author is mainly concerned with the determination of conditions sufficient to ensure the satisfaction of the above conditions for a given class \mathcal{E} when the operation of the taking of product is replaced by a δ -operation. The results obtained not only include most of those known on multiple separation but give many new cases, both for separation and nonseparation.

J. Todd (London).

Source: Mathematical Reviews,

Vol. 8 No. 6

Л. ПОПОВ А

Liapounoff, A. Sur les fonctions-vecteurs complètement additives, Bull. Acad. Sci. URSS. Ser. Math. [Izvestia Akad. Nauk SSSR] 10, 277-279 (1946). (Russian. French summary)

The present paper is a continuation of an earlier one with the same title [same Bull. 4, 465-478 (1940); these Rev. 2, 315]. For definition of terms we refer to the review of that paper. In the earlier paper it was proved that the set of values of any completely additive vector-function with values in an n -dimensional Euclidean space is convex. In the present paper it is shown that this theorem is no longer true if the value-space is infinite-dimensional, even if compact. This is shown by an example in which the value-space is a compact parallelepiped in l_1 . J. V. Wehausen.

Source: Mathematical Reviews,

Vol 9, No. 3

Handwritten signature

Lyapunov, A.

Lyapunov, A. On R -sets. Doklady Akad. Nauk SSSR
(N.S.) 58, 1887-1890 (1947). (Russian)

The author presents certain generalizations of the operation A , and announces theorems concerning the preservation of measurability and the property of Baire under these generalized operations. Close connections evidently exist with work of Kolmogoroff [Kantorovitch and Livenson, Fund. Math. 20, 54-97 (1933)].

E. Hewitt.

Source: Mathematical Reviews,

Vol 9 No. 7

SWT 22

Inst. Math. im. Steklov, A.S. USSR

LYAPUNOV, A. A.

200

Lyapunov, A. A. A new definition of certain classes of sets,
Doklady Akad. Nauk SSSR (N.S.) 59, 847-848 (1948).
(Russian)

The author presents a class of operations on families of
sets, which is not described in detail. He announces that
analytic sets in the line are characterized as the family of
sets obtained from intervals by all possible operations of
this class.

E. Hewitt (Seattle, Wash.).

Spill 1021

Source: Mathematical Review

Vol. 9 No. 8

LYAPUNOV, A.A.

DOC PHYSICOMATH SCI

Dissertation: "Concerning Operations Leading to Measureable Multiplicities."

1 Dec 49

Mathematics Inst imeni V.A. Steklov, Acad Sci USSR

SO Vecheryaya Moskva
Sum 71

LYAPUNOV, A.A.

Lyapunov, A. A. On continuous transformations of A -sets.
Izvestiya Akad. Nauk SSSR. Mat. 15, 61-64 (1951).
(Russian)

The following theorems are proved. (I) Let E be an analytic subset of the space I of irrational numbers, and let f be a continuous mapping of E into I . Then, for every $\epsilon > 0$, there exists a closed subset F of E such that $0 \leq \mu(f(E)) - \mu(f(F)) < \epsilon$, where μ is Lebesgue measure, and the mapping f is a homeomorphism on F . (II) If E is an analytic set and f is a continuous mapping of E into I , there exists a set $B \subseteq E$ of type G_δ such that $f(E) - f(B)$ is of first category and f is a homeomorphism on B .

E. Hewitt (Seattle, Wash.).

Mathematical Reviews,

Vol 10 No.

Smw
22

Lyapunov, A. A. B-functions. Uspehi Matem. Nauk
(N.S.) 5, no. 3(39), 109-119 (1950). (Russian)

Let X be a set and let Y be a topological space. Consider an initial class of functions mapping X into Y , which may be designated either as the 0 or the 1 class of functions. Let α be an ordinal number less than Ω , and suppose that for all $\beta < \alpha$, functions of class β have been defined. Then functions of class α are all pointwise limits of convergent sequences of functions of class less than α . These are Baire functions, and the classes of functions are Baire classes. For $U \subset Y$ let $[f(x) \in U]$ denote the set of points $x \in X$ such that $f(x) \in U$. As U runs through the families of all closed sets and all open sets in Y , the sets $[f(x) \in U]$ describe the Lebesgue sets of the function f . If X is a topological space, Borel sets in X are defined as follows: Let $X = \bigcup_n E_n$, where the sets E_n are open or closed and are pairwise disjoint. All sets obtainable as unions of subsequences of such sequences $\{E_n\}$ are sets of the 1st class. If $\alpha < \Omega$ and all classes of sets with number less than α have been defined, then the class of sets E obtainable in the form $E = \lim_{n \rightarrow \infty} E_n$, with E_n of class less than α , is the class of sets α . The union of all these classes is the class of B -sets. [Reviewer's note: Observe the difference between this definition and the usual definition of Borel sets.] A function all of whose Lebesgue sets are B -sets is a B -function. A function $y = f(x)$ such that the set of all $(x, f(x))$ in $X \times Y$ is a B -set in $X \times Y$ is said to be a quasi- B -function.

For the case $X = Y =$ the space of irrational numbers, one Source: Mathematical Reviews, Vol. 12, No. 3

takes the class of continuous functions as the initial class of functions, and Lebesgue sets for open-and-closed sets as the sets of class 0. Then the following assertions are true: (I) (Lebesgue) A function $y = f(x)$ is of class α if and only if all of its Lebesgue sets for open-and-closed sets are of class α ; (II) (Lebesgue) the class of B -functions is identical with the class of Baire functions; (III) (Luzin) the class of B -functions is identical with the class of quasi- B -functions.

Suppose that X and Y are complete metric spaces with countable bases. Then one may take the functions of class 1 to be the uniform limits of pointwise limits of continuous functions. In this case, a function is of class α if and only if its Lebesgue sets for closed sets are countable intersections of sets of class α . Theorems (II) and (III) above are true without alteration.

It is next shown that separable real Hilbert space admits a one-to-one mapping onto the space of irrational numbers such that the image and inverse image of a B -set of class $\alpha > \omega$ is again a set of the same class. Observations are next made concerning functions $\varphi(x, y) = 0$, where $\varphi(x, y)$ is a real B -function defined on $X \times Y$ (X and Y are complete metric spaces with countable bases). The set of all $x \in X$ for which there is a y such that $\varphi(x, y) = 0$ is always an A -set, and if the set of all such y is countable for every x , then the set of x is a B -set. If the implicit function $\varphi(x, y) = 0$ is single-valued, then it is a B -function. Finally, the author shows that every B -function on a complete metric space is continuous on a G_δ of the 2d category.

E. Hewitt.

LYAPUNOV, A.A.

24731. LYAPUNOV, A.A. Ob Zffertivnoy Izmerimosti Izvestiya Akad. Nauk. S^set, Seriya

Matem 1949, NO. 4, S. 357-62 Bibliograf¹5 Nazv.

SO: Letopis' No. 33, 1949

FA 172140

USSR/Mathematics - Set Theory (Groups) Sep/Oct. 50

"Series of Articles on the Descriptive Theory of Sets,"
A. A. Lyapunov, et al

"Uspekh Matemat Nauk" Vol V, No 5(39), pp 11-119

Subject theory has as object exam of properties of
continuum. Fundamental problems of this theory con-
sist in explanation of which of basic structural prop-
erties of sets are preserved as one goes from simplest
(prime) sets, both open and closed, to new more com-
plicated ones. In particular, theory established gen-
eral criteria which permit one to det magnitude, or
power, of certain sets or to make conclusions on their

172140

USSR/Mathematics - Set Theory (Groups) Sep/Oct. 50
(Contd)

dimensionality. Present issue initiates this series
with two articles: B-Sets by Ye. A. Shchel'kov and
A. A. Lyapunov and A-Sets by A. A. Lyapunov and V. A.
Arsenin.

LYAFUNCV A. A.

172140

LYAPUNOV, A. A.

Lyapunov, A. A. On the equivalence of families of sets.
Uspehi Matem. Nauk (N.S.) 5, no. 6(49), 143-144 (1950).
(Russian)

[For terminology and notation, see the preceding review.]
It is proved that there exists no family \mathcal{M} of subsets of R
consisting of c elements such that every family containing
 c sets is equivalent to some subfamily of \mathcal{M} .

E. Hewitt (Uppsala).

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Source: Mathematical Reviews,

Vol 12 No. 8

LYAPUNOV, A. A.

PA 171T66

USSR/Geophysics - Seismology Nov/Dec 50

"Frequency of Earthquakes," A. A. Lyapunov, and
S. M. Pandynshina, Geophys Inst, Acad Sci USSR

"Iz Ak Nauk SSSR, Ser Geog i Geofiz" Vol XIV,
No 6, pp 547-553

Analyzes time sequence of appearance of earth-
quakes which either had close centers or were
aftershocks of some large earthquake. Es-
tablished there is connection for the 1st; i.e.,
after some earthquake, probability of another

171T66

USSR/Geophysics - Seismology (Contd) Nov/Dec 50
occurring is increased. No such connection ob-
served for 2d type; average frequency of after-
shocks is quite variable. Submitted by Acad
A. N. Kolmogorov 13 May 50.

171T66

Lyapunov, A. A.

Lyapunov, A. A. On choosing from a finite number of distributions. *Uspehi Matem. Nauk* (N.S.) 6, no. 1(41), 178-186 (1951). (Russian)

Let F_1, \dots, F_n be probability measures defined on a Borel field of sets of an abstract space X . The author considers the problem of distinguishing which of the F_i 's has produced a sample x . The space X is to be expressed as the union of disjoint sets E_1, \dots, E_n , and the statistical rule is to be adopted that F_i is accepted if $x \in E_i$. The reliability of the rule is defined as $\min_i F_i(E_i)$. Suppose that each F_i is nonatomic and absolutely continuous with respect to every other F_j . Then it is shown that there are sets E_1, \dots, E_n maximizing the reliability. These sets are unique (neglecting sets of F_i -measure 0) if no two F_i 's are proportional on the subsets of a set of positive F_i -measure. In all cases $F_i(E_i)$

is independent of i ; and this condition is actually sufficient to determine the E_i 's in the following very special case. Let $\phi(x, a)$ be for each a a probability density in the real variable x , and suppose that $(\partial^2 / \partial a \partial x) \log \phi(x, a) > 0$. Then for any $a_1 < \dots < a_n$, if F_i above is identified with the distribution determined by the density with $a = a_i$, and if E_1, \dots, E_n are as above, E_1, \dots, E_n are intervals, ordered from left to right. The hypothesis on ϕ is satisfied in many cases, for example if ϕ is the normal density with fixed variance and mean a .

J. L. Doob (Urbana, Ill.).

Source: Mathematical Reviews.

Vol 12 No. 10

USSR/Mathematics - Mathematician Mar/Apr 52

"Petr Sergeyevich Novikov: On the Occasion of His
50th Birthday," A. A. Lyapunov

"Uspekh Matemat Nauk" Vol VII, No 2 (48), pp 193-196

Novikov's main work has been in the set theory of
modern algebra, sometimes in cooperation with his
students V. Ya. Arsenin, Z. I. Kozlov, and A. A.
Lyapunov. He has also worked in the field of ma-
thematical physics: He established the unique-
ness of solutions of the inverse problem in the theory
of potential for the case of star fields, which is
of great significance for theoretical geophysics.

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Entered Moscow U in 1922 when N. M. Luzin was head
of the Moscow Theoretical Functional School.
Novikov became one of his most intimate students.

LYAPUNOV, A. A.

214760

LYAPUNOV, A. A., MIGIRENKO, G. S.

Mathematics

Pseudo mathematical "reflections" of Mr. Richardson Priroda 41 no. 5, 1952

Monthly List of Russian Accessions, Library of Congress, August, 1952. UNCLASSIFIED.

LYAPUNOV, A. A., DR PHYS-MATH SCI

USSR/Mathematics - Criticism

May 52

"Concerning Richardson's Pseudomathematical
'Speculations,'" A. A. Lyapunov, Dr Phys-Math
Sci, G. S. Migrenko, Cand Mech Sci

"Priroda" No 5, pp 127,128

Scathing criticism of L. R. Richardson's article
"Can the Armament Race End Without War?" appear-
ing in the English journal "Nature," in which
a simple system of 2 simultaneous linear differ-
ential eqs is established to describe the proc-
esses of an armament race. The reviewers are

230T79

amazed that the editors of "Nature" could admit
such an unscientific article in their journal.
Claim that Richardson's ideas oppose Soviet
knowledge of the causes of war, namely, imperia-
listic aggression of capitalistic countries.

230T79

LYAPUNOV, A.A.

Lyapunov, A.A. On criteria of degeneracy of R -sets.
Izvestiya Akad. Nauk SSSR. Ser. Mat. 17, 563-578
(1953). (Russian)

The paper gives proofs of several propositions some of which were announced earlier [Doklady Akad. Nauk SSSR (N.S.) 58, 1887-1890 (1947); these Rev. 9, 339]. It is especially concerned with the question of finding in what measure the degeneracy criteria (Suslin, Luzin, etc.) for A -sets to yield B -sets have analogues for R -sets. Contrary to what happens with the Suslin criterion, the Luzin uniqueness criterion is transferable (Th. 4). Therefore, the "rigid" bases N of δ -operations are studied [according to Otchan, Mat. Sbornik N.S. 10(52), 151-163 (1942); these Rev. 7, 8] (N is rigid, provided it contains no two distinct comparable chains). In §2 one proves that (like A) R^* , R_* are operations definable by means of rigid bases (not so are $\lim \inf$, $\lim \sup$), a consequence of which is a form of uniqueness statement. Given: rigid basis N , the sequence $\{E_n\}_n$ of sets; then a point x is called an N -unique point of $\{E_n\}_n$ if there is a unique chain η of N so that $x \in \bigcap E_n$ ($n \in \eta$). Here is the analogue of Luzin's uniqueness statement. If $[N]$ is a rigid basis of R^* , let $\delta = \{E_{\alpha_1}, \dots, E_{\alpha_k}\}$ be a table or matrix of BR_{α_i} -sets (resp. BR_{α_i} -sets); if $U = R_{[N]}(\{E_{\alpha_1}, \dots, E_{\alpha_k}\})$ equals the set of the $[N]$ -unique points relative to δ , then U is a BR_{α_i} -set (resp. BR_{α_i} -set) (Th. 4). The Glivenko imbedding theorem [ibid. 36, 138-142 (1929)] is extended as follows: Under the same suppositions, there exists a set mapping $\delta' = \{H_{\alpha_1}, \dots, H_{\alpha_k}\}$ of BR_{α_i} -sets (resp. BR_{α_i} -sets) so that $H_{\alpha_1}, \dots, H_{\alpha_k} \supseteq E_{\alpha_1}, \dots, E_{\alpha_k}$ and that each point of $R_{[N]}(\delta')$ is an $[N]$ -unique point of δ' (Th. 5). G. Kurepa.

LYAPUNOV, A.A.

PA 246T88

USSR/Mathematics - Set Theory

Mar/Apr '53

"Classification of R Sets," A.A. Lyapunov, Moscow
"Matemat Sbornik" Vol 32 (74), No 2, pp 255-262

Continuation of author's previous article "R Sets"
("Trudy Matem In-ta im Steklova," Vol 40 (1953)).
Investigates the structure of the internal classification of R sets. States that the study of the various classes of sets that occur in the various constructions of mathematical analysis, theory of functions, etc., has given rise to the problem of the descriptive theory of sets. Submitted 25 Apr 52.

246T88

LYAPUNOV, A. A.

Mathematical Reviews
Vol. 14 No. 11
Dec. 1953
Analysis

Lyapunov, A. A. Separability and nonseparability of R -sets. Mat. Sbornik N.S. 32(74), 515-532 (1953). (Russian)

As sequel to some of his previous papers and in connection with researches of Lusin/Novikov, etc., the author studies the questions of separation of various kinds of sets by means of sets of another kind. As in the particular case of A -sets, one has 2 types of separation: the simple one (Lusin) and the multiple one (Novikov); in each of these cases one has to distinguish 2 types of separation, according as the intersection of the given sets to be separated is void or nonvoid. For example, for the simple separation one has the Lusin principles: (1) disjoint A -sets are B -separable (type 1); (2) if X, Y are A -sets, then $X - X \cap Y, Y - X \cap Y$ are separable by B -sets (type 2). The corresponding propositions hold true for what the author calls the ordinary $R\eta$ -operations (Theorems I, II). [For the terminology and notations one is referred especially to an unavailable paper of the author: Trudy Mat. Inst. Steklov. 40 (1953).] As a corollary to Theorem II one has the fact that if $z \in (A, R_\alpha, R_\alpha)$, then any pair of disjoint Z -sets can be separated by means of BZ -sets [cf. Lusin, Leçons sur les ensembles analytiques, Gauthier-Villars, Paris, 1930, p. 210 for $Z = A$]. Let λ be a regular class of transfinite functions and ϕ_λ a δ_λ -function such that $\Xi(\lambda)$ is invariant with respect to all δ_λ -functions ϕ_λ ; then for each sequence $\{E_n\}$ of $\Xi(\lambda)$ -sets there exists a sequence $\{H_n\}$ of $C\Xi(\lambda)$ -sets satisfying

LYAPUNOV, A.A.

R - sets. Trudy Mat.inst. 40:3-67 '53.

(MIRA 6:11)
(Aggregates)

LYAPUNOV, A.A., doktor fiziko-matematicheskikh nauk.

First volume of N.H.Luzin's works ("Collected works."
[matematik] N.H.Luzin. Reviewed by A.A.Liapunov). Vest.
AN SSSR 24 no.1:126-127 Ja '54. (MLRA 7:1)

1. Akademiya nauk SSSR (for Luzin).
(Luzin, Nikolai Nikolaevich, 1883-1950) (Mathematics)

LYAPUNOV, A. A.

✓★ Lyapunov, A. A., Stschegolkow, E. A., und Arsenin, 1 - F/W

W. I. Arbeiten zur deskriptiven Mengenlehre. Deutscher Verlag der Wissenschaften, Berlin, 1955. iii+108 pp. DM 15.15.

Translation of a collection of papers on the descriptive theory of sets: A. A. Lyapunov, Introduction; E. A. Stegol'kov, Elements of the theory of B-sets; V. Ya. Arsenin and A. A. Lyapunov, The theory of A-sets; A. A. Lyapunov, B-functions [Uspehi Mat. Nauk (N.S.) 5 (1950), no. 5(39), 11-13, 14-44, 45-108, 109-119; MR 12, 597].

RR
8/27

Lyapunov, A. A.

44-1-9

TRANSLATION FROM: Referativnyi zhurnal, Matematika, 1957, Nr 1, p 1 (USSR)

AUTHORS: Sobolev, S.L., Kitov, A.I., Lyapunov, A.A.

TITLE: The Principal Features of Cybernetics (Osnovnyye cherty kibernetiki)

PERIODICAL: Vopr. Filosofii, 1955, Nr 4, pp 136-148

ABSTRACT: The article represents the first attempt at a serious study of the scientific content of cybernetics. Cybernetics is defined as a new scientific trend, created by N. Wiener, which is not, however, a sufficiently well-developed and complete scientific discipline. The main divisions of cybernetics, according to the authors, are: (1) information theory; (2) theory of computing machines, as a theory of self-organizing logical processes similar to human thinking; and (3) theory of automatic control systems, which includes the study, from the functional point of view, of the working processes of the nervous system, the sensory organs and other organs of living organisms. Attention is given to the mathematical apparatus of cybernetics, in particular to the study of information, with reference to the work of K. Shannon (collection of translations, "Transmission of Electrical Signals in the Presence of Interference", Moscow, 1953) and A. Ya. Khinchin (Math., 1954, 3771). The necessity of combating foreign reactionary

Card 1/2

44-1-9

The Principal Features of Cybernetics (Cont.)

ideology is noted and at the same time the mistakes of several Soviet philosophers who did not understand the scientific content of cybernetics are pointed out. The authors themselves do not give a critique of the philosophical idealistic concepts connected with the development of cybernetics.

P.Ye. Sivokon'

Card 2/2

Lyapunov, A. A.

Aleksandrov, P. S., and Lyapunov, A. A. Lyudmila I - F/7
Vsevolodovna Keldys (on her fiftieth birthday). Uspehi
Mat. Nauk 10, no. 2(64), 217-223 (1 plate) (1955).
(Russian)
A list of her published papers is included.

LYAPUNOV, A.A., professor; KULAGINA, O.S.

Using calculating machines in translating from one language into another. Priroda 44 no.8:83-85 Ag '55. (MIRA 8:10)

1. Matematicheskii institut imeni V.A.Steklova Akademii nauk SSSR
(Translating machines)

Lyapunov, A. A.

USSR/Geophysics

Card 1/1 Pub. 22 - 19/59

Authors : Lyapunov, A. A.

Title : A criterion for checking the interpretations of gravitational observations

Periodical : Dok. AN SSSR 102/2, 365-366, May 11, 1955

Abstract : A method is described for checking the interpretation of observed gravitational data. It consists in the construction of a certain analogue, the quantity of which is similar to the observed data and can easily be calculated (the final integrals used in the calculations are taken in arbitrary but limited regions). Four USSR references (1936-1940). Diagrams.

Institution : Acad. of Sc., USSR, Mathematical Institute imeni V. A. Steklov.

Presented by : Academician G. A. Gumburtsov, December 31, 1954

LYAPUNOV, A. A.

A

Avtomatizatsiya perevoda s odnogo yazyka na drugoy
(by) D.Y. Panov, A.A. Lypunov (1) I.S. Mukhin.
Moskva, Izd-vo Akademii Nauk SSSR, 1956.

33 p.

At head of title: Akademiya Nauk SSSR. Sessiya po
Nauchnym Problemam Avtomatizatsii Proizvodstva. Plen-
arnoye Zasedaniye.

LYAPUNOV, A. A., Dr. of Phys. Math. Sci. and YU. I. YANOV, Scientist

"Logical Program Schemes" a paper presented at the Conference on Methods of Development of Soviet Mathematical Machine-Building and Instrument-Building, 12-17 March 1956.

Translation No. 596, 8 Oct 56

LYAPUNOV, A. A.

"Algorithms of the Transformation of Information," a paper presented at the Soviet Conference on Communication Theory, 6-7 Dec 55, Priroda, March 1956

Sum. 916, 3 May 56

ЛЯПУНОВ, А. А.

Call Nr: AF 1108825

Transactions of the Third All-union Mathematical Congress, Moscow, Jun-Jul '56,
Trudy '56, V. 1, Sect. Rpts., Izdatel'stvo AN SSSR, Moscow, 1956, 237 pp.

Lyapunov, A. A. (Moscow). On Logical Program Charts.

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LYAPUNOV, A. A., YABLONSKIY, S. V., POLETAYEV, I. A. and KITOV, A. I.

"On Cybernetics," Trudy tret'yego Vsesoyuznogo matematicheskogo s"yezda
/Proceedings of the Third All-Union Mathematics Congress/, Vol. II. Brief
outline of survey and sectional papers, Publishing House of the Academy of
Sciences USSR, Moscow, 1956, Pages 76 - 77.

SOV/169-59-3-2268

Translation from: Referativnyi zhurnal, Geofizika, 1959, Nr 3, p 30 (USSR)

AUTHOR: Lyapunov, A.A. ✓

TITLE: On the Interference of Seismic Vibrations

PERIODICAL: Sb. posvyashch. pamyati akad. P.P. Lazareva, Moscow, AS USSR, ✓
1956, pp 363 - 372

ABSTRACT: The article has not been abstracted.

Card 1/1

LYAPUNOV, A. A.

KELDYSH, M. B., akademik; LYAPUNOV, A. A., doktor fiziko-matematicheskikh nauk; SHURA-BURA, M. B., doktor fiziko-matematicheskikh nauk.

Mathematical problems in the theory of calculating machines.
Vest.AN SSSR 26 no.11:16-37 N '56. (MLRA 9:12)
(Electronic calculating machines)

LYAPUNOV, A. A. and SOBOLEV, S. L.

Kibernetika i estestvoznaniye [Cybernetics and Natural Science], Publishing House of the Academy of Sciences USSR, 1957, 26 pages. (Material for the All-Union Conference on Philosophical Problems of Natural Science).

SOV/112-58-2-2658

Translation from: Referativnyy zhurnal, Elektrotehnika, 1958, Nr 2, p 137 (USSR)

AUTHOR: Keldysh, M. V., Lyapunov, A. A., and Shura-Bura, M. R.

TITLE: Mathematical Problems of the Theory of Computers
(Matematicheskiye voprosy teorii schetnykh mashin)

PERIODICAL: V sb.: Sessiya AN SSSR po nauchn. probl. avtomatiziroiz-va, 1956. Plenarn. zasedaniya. M., AS USSR, 1957, pp 100-130, discussion pp 148-161

ABSTRACT: The mathematical, logical, and technical principles of electronic computers can be used in creating new automatic devices, the functioning of which can be specified by a definite sequence of logical or arithmetical operations. From this standpoint, principles of digital and analog computers are set forth, as well as the mathematical bases of their functioning. Methods for automatically realizing a number of algorithm-forming processes are considered: mathematical-problem programming, interlingual translation, data processing, production-process control, dispatcher control, etc. Some cybernetics problems are examined, cybernetics being defined as the science of the creation and structural analysis of algorithms that depict surrounding phenomena and the science that describes the algorithms.

SOV/112-58-1-927

Translation from: Referativnyy zhurnal, Elektrotehnika, 1958, Nr 1, p 135 (USSR)

AUTHOR: Panov, D. Yu., Lyapunov, A. A., and Mukhin, I. S.

TITLE: Automation of Interlingual Translations

(Avtomatizatsiya perevoda s odnogo yazyka na drugoy)

PERIODICAL: V sb.: Sessiya AN SSSR po nauchn. probl. avtomatiz. proiz-va, 1956. Plenarn. zasedaniya, Moscow, AS USSR, 1957, pp 181-213, discussion p 214.

ABSTRACT: A detailed description is submitted of two methods of translating foreign languages into Russian, as developed at the Mathematical Institute imeni Steklov and at the Institute of Fine Mechanics and Computing Techniques. The first method was programmed for "Strela" computer; the second method for "BESM" computer. In addition to translations from European languages, some problems of translation from Chinese and Japanese are also considered, as well as from one foreign language into another, using Russian as an intermediary language. There are 7 illustrations.

N. Ya. N.

AVAILABLE: Library of Congress

Card 1/1 1. Language 2. Computers--Applications

LYAPUNOV, A.A. (Moscow); SHESTOPAL, G.A. (Moscow)

Elementary information on the solution of problems by electronic
calculating machines. Mat. pros. no.1:57-74 '57. (MIRA 11:7)
(Electronic calculating machines)

LYAPUNOV, A.A. (Moscow); SHESTOPAL, G.A. (Moscow)

Algorithmic description of control processes. Mat. pros.no.2:81-95 '57.
(MIRA 11:7)

(Cybernetics)

LYAPUNOV, A.A. (Moscow)

Real numbers; teaching in institutes of technology with large
mathematics programs. Mat. pros.no.2:149-156 '57.

(MIRA 11:7)

(Numbers, Theory of)

LYAPUNOV, A.A.

Operations with sets permitting transfinite indices. Trudy Mosk.
mat.ob-va 6:195-230 '57. (MIRA 10:11)

(Aggregates)

LYAPUNOV, A.A., professor.

Embryonic cells contain the hereditary information coded by some
microstructures. Tekh.mol. 25 no.6:8 Je '57. (MLRA 10:7)
(Heredity)

LYAPUNOV, A. A.

TIMOFEEV-RESOVSKIY, L.V., professor; LYAPUNOV, A.A., professor.

A common language is needed for mathematicians, physicists,
chemists, and biologists. Tekhnol. 25 no.6:11 Je '57.

(MLRA 10:7)

(Science)

LYAPUNOV, A.A.; YABLONSKIY, S.V.

An outstanding contribution to mathematics. Priroda 46 no.8:54-56
Ag '57. (MLRA 10:9)

1. Matematicheskiy institut im. V.A. Steklova Akademii nauk SSSR,
Moskva.

(Groups, Theory of)

LYAPUNOV, H. H.
SOBOLEV, S. L. (Acad.) and LYAPUNOV, A. A. (Prof.)

"Cybernetics and the Natural Sciences."

report presented at All-Union Conference on Philosophical Questions of the Natural Sciences, Moscow Scientists Club 22 October 58

LYAPUNOV, A. A. and KULAGINA, O. S. (Moscow)

"About the Work by Machine Translation of the Mathematics Institute AS SSR"

Theses - Conference on Machine Translations, 15 - 21 May 1958, Moscow.

LYAPUNOV, A.A.

Algorithms for information processing. Izv.vys.ucheb.zav.; radiofiz.
[1] no.1:106-109 '58. (MIRA 11:11)

1. Matematicheskiy institut imeni V.A. Steklova AN SSSR.
(Algorism)

LYAPUNOV, ALEKSEY, ANDREYEVICH

PHASE I BOOK EXPLOITATION

SOV/1128

Problemy kibernetiki, vyp. 1 (Problems of Cybernetics, no. 1)
Moscow, Fizmatgiz, 1958. 268 p. 20,000 copies printed.

Ed. (title page): Lyapunov, Aleksey Andreyevich; Ed. (inside book):
Smolyanskiy, M.L.; Tech. Ed.: Kolesnikova, A.P.; Eds. and Com-
pilers: Lupanov, O.B., Pil'chak, B.Yu., Kulagina, O.S.,
Yablonskiy, S.V.

PURPOSE: The book is intended to relate the interests of scientific
and engineering personnel whose work involves various aspects of
cybernetics.

COVERAGE: This collection of articles deals with general problems of
cybernetics, information theory, theory of algorithms and automatic
machines, theory of control systems, theory of games and tactics,
methods of operations analysis, problems in the theory of cal-
culating machines, programming, and the application of cybernetics
to other sciences, such as biology, economics and linguistics.
"Problems of Cybernetics", as a recurrent publication, will continue
to include original papers, survey articles and translations and,

Card 1/4

Problems of Cybernetics, no. 1

SOV/1128

like the present work, will contain the results of seminars in cybernetics held at Moscow University. There are 107 references, of which 104 are Soviet, 2 English and 1 Hungarian.

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Problems of Cybernetics, no. 1

SOV/1128

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IV. PROBLEMS OF MATHEMATICAL LINGUISTICS

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AVAILABLE: Library of Congress

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2-24-59

Card 4/4

LYAPUNOV, A. A.

"On Cybernetics" (21 September 1956).

Paper presented at the Seminars on Cybernetics at Moscow University during the 1956-57 school year.

Problemy Kibernetiki, No. 1, 1958

LYAPUNOV, A. A.

"On the Fundamental Problems of Cybernetics" (10 October 1955);
"Algorithmic Scheme of the Elementary Mechanism of Thinking" (14 November 1955);
"The Concept of Probabilist Processes. Simulation of the Production of
Conditioned Reflexes in the Form of a Markov Process" (12 December 1955);
"Relationships Between Discrete and Continuous Processes in Biological
Processes" (13 February 1956); "Cybernetic Problems of Genetics" (12 March 1956);
"Directed and Random Component Motion of Living Beings (on the Works of
N. I. Kobzev)" (2 April 1956); "Random Occurrences, Values, and Processes and
Certain Biological Processes Connected with Them" (16 April 1956); "On Some
Statistical Problems of Cybernetics and Biology" (7 May 1956).

Paper presented at the Seminars on Cybernetics at Moscow University during
the 1955-56 school year.

So: Problemy Kibernetiki, No. 1, 1958, pp. 265-66

LYAPUNOV, A. A.

"On a Theoretical-Information Approach to the Fundamentals of Genetics"
(29 February 1957).

Paper presented at the Seminars on Cybernetics at Moscow University during
the 1956-57 school year.

Problemy Kibernetiki, No. 1, 1958

66526

SOV/112-59-18-38686

166800
Translation from: Referativnyy zhurnal, Elektrotehnika, 1959, Nr 18, p. 100. (U3SE)

AUTHOR: Lyapunov, A.A.

TITLE: On Logical Programming Schemes

PERIODICAL: V sb.: Probl. kibernetiki. Nr 1, Moscow, Gos. izd-vo fiz.-matem. lit.,
1958, pp 46 - 74

ABSTRACT: The logical principles of the programming of problems for their solution by high-speed digital computers are investigated. General information on programming is given. Some hypothetical conditional computer (CC) and some simple programs, made suitable for this conditional computer, are described. The conception of the computing scheme is introduced, by which the product of operators and logical conditions is understood. Each operator performs one of the stages in the treatment of information, the initial algorithm can be divided into. The logical conditions are destined for the determination of the order of performance of the operators, which are not always predetermined and change according to the results obtained in the course of the work of other operators. The product of the operators is called their subsequent performance. As examples the computation schemes are given

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On Logical Programming Scheme

SOV/112-59-18-32606

for the algorithm of building consecutive squares of natural numbers, squares of even numbers only and products of two square matrices. The difference between the computation scheme and the programming scheme (PS) is pointed out. While the former deals with operators in an abstract sense the PS deals with programs which carry out these operators. The PS for the solution of various problems is called the product of the programming performance of the operators and of logical conditions. In order to pass over from the computation scheme to the PS, it is necessary to add control operators, which prepare the memory device to carry out next computing operators and the logical conditions, the verification of which warrants the required sequence of the computing operators. The following types of control operators are distinguished: re-addressing, re-storage, formation, change of parameter, transfer, switching over of the logical conditions, input of parameters. Their determination and examples of application in the PS are given. The possibility of an equivalent transformation of the PS for the solution of definite problems is pointed out and by this the search of a rational program. Examples of essential transformation of the PS are examined, which consider the individual peculiarities of the problem to be solved, in contrast to formally identical transformations of algorithms. As a particular example the solution of the Dirichlet problem on the square by the method of iterations with the concentration of the network is cited. The method of logical scales

Card 2/3

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66526

On Logical Programming Scheme

SOV/112-59-18-38686

for problem programming is described, in which a certain logical condition has different meanings at different stages of computation. Cases may happen when the course of solving a problem is controlled by several logical conditions and the order of computation depends on some function of these conditions. Two different methods of programming with the aid of functional logical scales are recommended.

E.A.G

Reference: Referativnyy zhurnal, Elektrotehnika, 1957, abstract Nr 21370.

Card 3/3

LYAPUNOV, A. A.

"Cybernetics and Its Future," Moskovskiy propagandist [Moscow Propagandist],
1958, No. 1, Pages 69 - 73.

06520

SOV/141-58-1-10/14

AUTHOR: Lyapunov, A. A.

TITLE: Algorithms for the Processing of Information

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika,
1958, Nr 1, pp 106-109 (USSR)

ABSTRACT: The problem of information handling requires a set of rules for the processing of all possible messages which form the information. The rules should provide the possibility of solving various types of problems. Normally, the rules of information processing, referred to as the information processing algorithms, are in the form of a set of orders which permit the processing of certain types of messages; further, certain conditions are implied which determine the order in which the rules are applied to the processed message. The article aims at expounding a method of setting up the algorithms which would be suitable for programming a computer. The method is used in the programming of various arithmetical problems as well as the programming of non-arithmetical algorithms. An algorithm is split into a number of elementary

Card 1/4

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SOV/141-58-1-10/14

Algorithms for the Processing of Information

acts, each of which is performed in accordance with a pre-determined simple rule. The elementary acts will be denoted by Latin capitals with subscripts which denote the parameters on which a given act depends. These acts are referred to as the elementary operators. The logical conditions will be denoted by small Latin letters. Each logical condition is followed by an arrow which denotes the direction of the transition if the condition is not fulfilled. A process can be synthesized by using simple operators and logical conditions. Thus, for example, an operator:

$$A_p \overline{BC} \downarrow$$

is ABC for $p = 1$ and A for $p = 0$. If the logical condition consists of checking a certain equality or inequality, the expression to be checked is in the form of an argument. This is expressed in the form of:

$$\downarrow A_i.p(i > n) = A_1.A_2. \dots .A_n.$$

Card 2/4

The system of constructing the algorithms is illustrated by an example. A system of linear algebraic equations, repres-

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SOV/141-58-1-10/14

Algorithms for the Processing of Information

ented by the first equation on p 108, is to be transformed into the diagonal form without selecting the main elements. The computing code can be represented by the second equation on p 108, where the symbol

$$\prod_{l=1}^n$$

denotes the multiplication of the operators in the order of increasing parameters from $l = 1$ to $l = n$. The programme scheme can be written as the last equation on p 108, where $F(l)$ denotes the operator which increases the parameter l by a unit, while $\{l \rightarrow l\}$ is an operator substituting unity

Card 3/4

06520 SOV/141-58-1-10/14

Algorithms for the Processing of Information

instead of the parameter λ . The paper contains 7 Soviet references.

ASSOCIATION: Matematicheskii institut im. V. A. Steklova AN SSSR
(Mathematical Institute im. V. A. Steklov, Academy of
Sciences, USSR)

SUBMITTED: June 27, 1957.

Card 4/4

ZALGALLER, S.I. (Leningrad); SKOPETS, Z.A. (Yaroslavl'); ROFE-BEKTOV, F.S.
(Khar'kov); LANDIS, Ye.M. (Moskva); LEVIN, V.I. (Moskva); STECHKIN,
S.B. (Moskva); LYAPUNOV, A.A. (Moskva); ARBOL'D, V.I. (Moskva);
LOPSHITS, A.M. (Moskva)

Problems of higher mathematics. Mat.pros. no.3:270-274 '58.
(MIRA 11:9)
(Mathematics--Problems, exercises, etc.)

LYAPUNOV, A. A. and SOBOLEV, S. L.

"Cybernetics and Natural Science," Voprosy filosofii [Problems of Philosophy],
1958, No. 5, Pages 127 - 138.

AUTHOR: Lyapunov, A.A. SOV/140-58-5-14/14
TITLE: On Mathematical Problems of Cybernetics (O matematicheskikh problemakh kibernetiki)
PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Matematika, 1958, Nr 5, pp 166-174 (USSR)
ABSTRACT: The paper gives a survey beginning with the possible definitions of the notion of cybernetics and then essentially deals with the Russian contributions to the theory of algorithms and to the information theory. As the central problem of cybernetics the author considers the construction of the theory of the most general control and regulation schemes. There are 41 references, 34 of which are Soviet, and 7 American.
ASSOCIATION: Matematicheskii institut imeni V.A.Steklova AN SSSR (Mathematical Institute imeni V.A.Steklov, AS USSR)
SUBMITTED: November 27, 1957 (Date of Lecture, Leningrad)

Card 1/1

PHASE I BOOK REPRODUCTION SOV/3493

Vsesoyuznoye soveshchaniye po filosofskim voprosam yestestvoznaniya
Filosofskiy problem soveshnogo yestestvoznaniya: trudy sovesh-
chaniya... (Philosophic Problems of Modern Natural Science;
Transactions of the All-Union Conference on Philosophic Problems
of Natural Science) Moscow, Izd-vo AN SSSR, 1959. 663 p.
Kratka slip inserted. 6,000 copies printed.

Sponsoring Agency: Akademiyu nauk SSSR.

Ed. of Publishing House: A.I. Kompaneyskiy; Tech. Ed.: I.M. Dorokhin;
Editorial Committee: P.M. Fedoseyev, Corresponding Member, A. V. V. V.
Academy of Sciences USSR (Chairman), E.M. Vul, Corresponding Member,
Academy of Sciences USSR, M.E. Osel'yanskiy, Academician, Academy
of Sciences USSR, N.M. Siskayev, Corresponding Member, Academy
of Sciences USSR, V.N. Skolotov, Professor, and Ye.N. Chusakov,
Candidate of Philosophical Sciences (Scientific Secretary)

PURPOSE: This book is intended for natural scientists and philosophers
who are interested in coordinating Communist philosophy with science.
COPYRIGHT: This book is the property of the Academy of Sciences of the
Conference on Philosophic Problems of Natural Science, which took
place in Moscow, October 21-25, 1959. The Conference was
attended by 20 academicians and 30 corresponding members of the
Academy of Sciences USSR, 15 academicians and 34 members of re-
public and special academies, 186 university and college workers,
240 workers of scientific research institutes, and 75 party
officials. The purpose of the Conference, as expressed by the
Chairman of the Organization Committee, K.V. Ostrovitsyanov, was
to unite the efforts of Soviet philosophers and scientists in
the dialectical-materialistic interpretation of the achievements
of modern science, and to provide the philosophical background
required for the study of modern scientific problems.

Mitin, M.B., Academician. A Great Ideological Instrument for the
Investigation and Transformation of the Universe (Commemorating
the 50th Anniversary of the Completion of V.I. Lenin's Book
Materialism and Empirio-criticism) 12

Osel'yanskiy, M.E., Academician, AS USSR. V.I. Lenin and the
Philosophical Problems of Modern Physics 32

Aleksandrov, A.D., Corresponding Member, AS USSR. Philosophic
Content and Significance of the Theory of Relativity 93

Erdrov, B.M., Professor. Relationships Between the Different
Form of Motion in Nature 137

Pok, V.A., Academician. Interpretation of Quantum Mechanics 212
Sobolev, S.I., Academician, and A.A. Lyapunov, Professor. Cyber-
netics and Natural Science 237

Abartamyan, V.A., Academician. Certain Methodological Problems
of Cosmology 268

Frank, G.M., Corresponding Member, Academy of Medical Sciences
USSR, and V.A. Engel'gardt, Academician. Role of Physics and
Chemistry in the Study of Biological Problems 291

Oshin, A.I., Academician. Problem of the Origin of Life in the
Light of the Achievements of Modern Science 324

Grazhenkov, N.I., Corresponding Member, AS USSR. Lenin's Theory
of Reflection and the Modern Physiology of the Sense Organs 341

DISCUSSION OF REPORTS

Shirokov, M.P., Professor 365

Card 4/11

(12)

LYAPUNOV, A.A.

Role of mathematics in secondary education. Mat. prob. no. 4:153-154
'59. (EIPA 12:11)
(Mathematics--Study and teaching)

by A. P. Puchov, A. A.

30(9)
AUTHOR:
TITLE:
PERIODICAL:
ABSTRACT:
Card 1/3

None Given
All-Union Conference on Philosophical Problems of Modern Natural Science (vsesoyuznoye sovershaniye po filosofskim voprosam sovremennoye yestestvoznaniya) By the Editor (Ot redaktsii) Uspeski fizicheskikh nauk, 1959, Vol. 68, No. 4, pp. 717-727 (922R)
The above conference took place at Moscow in October 1958; it was attended by more than 600 scientists, Academicians, AS USSR, AS Academies and 30 Corresponding Members, AS USSR, as well as by delegates from Bulgaria, Czechoslovakia, East Germany, and Czechoslovakia. The following lectures delivered at the conference are listed: Academician M. M. Mishin (on Lenin's book "Materialism and Empirio-criticism"), Academician AS USSR E. E. Gurevich (on "The Philosophy of Science"), Academician AS USSR M. M. Keldysh ("On the Relationship of the Forms of Motion of Matter in Nature"), Academician V. A. Fok ("Interpretation of Quantum Mechanics" - already published in Uspeski fizicheskikh nauk, 1957, Vol. 65, No. 4), Corresponding Member AS USSR A. D. Aleksandrov ("The Philosophical Content of and the

Significance of the Theory of Relativity"), Academician V. A. Izrael (on "Some Methodological Problems of Cosmology"), Academician V. A. Sobolev and Professor A. A. Migulin ("Cybernetics and Natural Science"), Corresponding Member AS USSR O. M. Frank and Academician V. A. Engel (on "The Part Played by Physics and Chemistry in the Development of Biological Problems"), Academician I. I. Smolitskiy ("The Problem of the Origin of Life in the Light of the Progress Made by Modern Natural Science"), and finally, Corresponding Member AS USSR M. I. Belyavskiy ("Lenin's Theory of Reflection and the Philosophy of the Sensory Organs"). About 50 delegates took part in the discussion of these lectures. Next, the introductory speech delivered by the President of the AS USSR, Academician A. N. Kosygin, is reproduced, and he is the closing speech by Corresponding Member AS USSR P. N. Medvedev, and finally a resolution passed by the All-Union Conference on philosophical problems of modern natural science is given under the title "On the Tasks of dealing with Philosophical Problems of Natural Science". The resolution essentially contains an appeal for the

investigation of all new scientific facts in the sense of the theory of Marx, Lenin and of dialectic materialism for adaptation of ideas to the resolution of the 20th Party Congress, cooperation of institutes, coordination of research work, as well as some problems of organization. In conclusion, a list of printed works is given, in which the lectures delivered during the conference were published. There are 8 Soviet references.

Card 2/3

Card 3/3

LYAPUNOV, A. A. and BERG, A. M.

"Prospects for the use of electronic computers in the State apparatus."

report submitted for the Soviet Conference on Problems in the Application
of Mathematical Methods in Economic Research, Leningrad, 18-21 January 1960

LYAPUNOV, A.A. (Moskva)

Fundamentals and style of present day mathematics (with reference
to the article of N. Bourbaki. Mat. pros. no.5:113-115 '60.

(MIRA 13:12)

(Mathematics)

(Bourbaki, N.)

LYAPUNOV A. A. and FINKEL'SHTEYN, Yu, Yu.

"On the Formulation of the Behavior of a Group of Automatic Devices."

Report submitted for the Symposium on Principles in the Design of
Self-Learning Systems, Kiev Ukr SSR, 5-9 May 1961

LYAPUNOV, A. A. and MALENKOV, A. G.

"Logical Analysis of Concepts and Methods of Genetics" (27 November,
11 December 1959)

report delivered at a seminar on cybernetics, Moscow State University

So: Problemy kibernetiki, Issue 5, 1961, pp. 289-294

LYAPUNOV, A. A. and MALENKOV, A. G.

"On the Systematization of the Main Concepts of Genetics"

presented at the All-Union Conference on Computational Mathematics and
Computational Techniques, Moscow, 16-28 November 1961

So: Problemy kibernetiki, Issue 5, 1961, pp 289-294

LYAPUNOV, A. A. (Prof.) and BERG, A. I.

"On Prospects of Utilization of Computers in the Government Organization"

→ presented at the All-Union Conference on Computational Mathematics and
Computational Techniques, Moscow, 16-28 November 1961

So: Problemy kibernetiki, Issue 5, 1961, pp 289-294

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S/044/62/000/011/064/064
A060/A000

9.7000
16.7000

AUTHORS: Bagrinovskaya, G. P., Kulagina, O. S., Lyapunov, A. A., Moloshnaya, T. N.

TITLE: Some problems in mathematical linguistics arising in connection with machine translation

PERIODICAL: Referativnyy zhurnal, Matematika, no. 11, 1962, 88, abstract 11V501
(In collection: "Mash. perev. i prikl. lingvistika". no. 6, Moscow, 1961, 19 - 38)

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TEXT: In this report, given at the Conference on mathematical linguistics in Leningrad in 1959, the possibilities are considered of a further development of the ideas of A. A. Lyapunov and O. S. Kulagina, formulated in O. S. Kulagina's paper "On a method of defining grammatical notions on the basis of the theory of sets" ("Problemy kibernetiki", Moscow, 1958, no. 1). It is proposed to distinguish three forms of information characterizing a sentence: a) indication of the context to which every word belongs (lexical information); b) indication of the families to which every word belongs (morphological information); c) indication of the configuration (syntactic information). The syntactic information

Card 1/2

Some problems in mathematical...

S/044/62/000/011/064/064
A060/A000

consists in indicating the number of the vertex in the sentence tree, where every tree is considered as a subset of the universal Cantor tree. The latter assumption is verified by the two-term character of the majority of configurations in natural languages. A method is also indicated for describing the syntactic information by constructing the universal graph of families of the language, where pairs entering in the same configuration are considered as connected. It is claimed that it is necessary to couple the set-theoretic modelling of a language with the information-theoretic approach and then one will learn to estimate precisely the degree of approximation of the abstract model to the real language, and in this connection to establish statistically the fundamental (in contrast to the "non-fundamental") characteristics of the language. It is indicated that the solution of all these problems connected with machine translation may promote the development of the still inexistent theory of algorithms with ratings. In conclusion certain general considerations are presented as to the method of constructing translation algorithms, the employment of mathematicians and linguists, and the preparation of cadres in that domain.

[Abstracter's note: Complete translation]

I. I. Revzin

Card 2/2

S/044/62/000/005/055/072
C111/C444

AUTHORS: Lyapunov, A. A., Kitov, A. I.

TITLE: Cybernetic in technics and economics

PERIODICAL: Referativnyy zhurnal, Matematika, no. 5, 1962, 55-56,
abstract 5V300. ("Vopr. filosofii," 1961, no. 9, 79-88,
185)

TEXT: One points to two domains of application of the cybernetic in technics: the automation of controlling machines and of their complexes the carrying-out of complicated calculations and modellings of dynamic and logical systems and processes. The significance of bionic is explained. Two types of economic problems are mentioned for the solution of which electronic computing machines can be used: the developing of models of economic systems and the solution of planing economic problems of optimization. At last one discusses the question of a uniform system of public computing centres and the problem of a rational use of the electronic technic of computing.

[Abstracter's note: Complete translation.]

Card 1/1

LYAPUNOV, A. A.

LAPUNOW, A. A.; SZESTOPAL, G. A. (Moskwa)

An algorithmic interpretation of control processes. Rocznik matematyczny 4
no.2:187-202 '61.

(Automatic control) (Railroads)

LYAPUNOV, A.A., red.; LUPANOV, O.B., red.; RIKKO, N.N., red.;
MOSKATOV, G.K., red.; IOVLEVA, N.A., tekhn. red.

[Collection of translations on cybernetics] Kiberneticheski
sbornik; sbornik perevodov. Moskva, Izd-vo inostr. lit-ry.
No.4. 1962. 255 p. (MIRA 16:4)
(Cybernetics)

S/582/62/000/008/009/013
D405/D301

AUTHOR: Lyapunov, A. A. (Novosibirsk)

TITLE: On algebraic treatment of programming

SOURCE: Problemy kibernetiki. no. 8. Moscow, 1962, 235-241

TEXT: An attempt is made at ascertaining the connection between the basic concepts of programming and the theory of categories. Various concepts are defined (used elsewhere in same source: pp. 191-200, 201-209, 211-233). A memory is defined as the set $\Omega = \{x\}$ of elements called cells. G is the set of elements called states of cells. The mapping of Ω on G is called memory state. A mapping $A(f)$ of one set of possible memory states f onto another is called an operator over Ω . The operators over Ω form a category. A mapping $p(f)$ of a set of possible memory states onto a set U of arbitrary elements is called predicate over Ω ; $p(f)$ -composition of a system of operators A^u is defined as $B(f) = A^u(f)$ for $p(f) = u$. Other definitions refer to subordination of classes, equivalence, algebra of sets generated by a class, and re-addressing operators.

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Further, the control memory Ω^1 is considered, which serves for storing the logical schemes over Ω . A logical scheme is defined as the system of terms $\alpha_1, \alpha_2, \dots, \alpha_k$. The terms are ordered pairs (A, m) consisting of an operator A and a natural number m , or ordered pairs consisting of a predicate $p(f)$ and a function $m(u)$; the terms can also be classes of functions M which map the set U onto the sequence of natural numbers. A logical scheme defines an operator over Ω .

SUBMITTED: February 23, 1961

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S/582/62/000/008/011/013
D405/D301

AUTHORS: Lyapunov, A. A. and Malenkov, A. G. (Novosibirsk)

TITLE: Logical analysis of the structure of hereditary information

SOURCE: Problemy kibernetiki. no. 8. Moscow, 1962, 293-308

TEXT: The structure of hereditary information is studied with a view to comparing it with the structures, examined in cytology, which are the material carriers of this information, i.e. with the chromosomes. The discrete part of hereditary information is singled out and its structure is analyzed. The basic concepts are expressed in axiomatic form, summing up vast experimental material. The statistical properties of the object are expressed as postulates. The elementary biological processes are formulated as laws. All the laws and postulates enunciated are valid only with sufficiently high probability. Their violation is called mutation. The appearance of mutations in biological acts represents errors in the transmission of information. The external factors responsible for

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the mutations represent the noise background. The phenomena are studied according to their degree of probability; only phenomena whose probability is almost one or far from both one and zero are studied. The present work does not list new facts, it only systematizes the already known from the point of view of information theory. The method proposed is of interest since it enables one to judge to what extent the structural details of hereditary information and of the chromosome apparatus correspond to each other. The structure of the hereditary information is compared with the data of cytology as follows: 1) The discrete part of hereditary information, consisting of a finite number of genes, is examined. 2) The requirements towards the structure of the material carriers of hereditary information are formulated. 3) The structure of the chromosomes is tested from the point of view of these requirements. Conclusion: Chromosome structure corresponds in great detail to the structure of hereditary information.

SUBMITTED: May 12, 1960 (initially)
February 3, 1961 (final version)

Card 2/2

BUDKER, A.M.; LYAPUNOV, A.A., prof.; LAVRENT'YEV, M.A., akademik; VEKUA, I.N., akademik; MIGIRENKO, G.S., prof.; ZHURAVLEV, Yu.I., kand.fiziko-matem. nauk

Birth of a new method for the training of young scientists. Tekh.mol. 30 no.11:14-17 '62. (MIRA 16:9)

1. Chlen-korrespondent AN SSSR (for Budker). 2. Predsedatel' Sibirskogo otdeleniya AN SSSR (for Lavrent'yev). 3. Rektor Novosibirskogo universiteta (for Vekua). 4. Sekretar' partiynogo komiteta Sibirskogo otdeleniya AN SSSR (for Migirenko). 5. Chlen TSentral'nogo komiteta Vsesoyuznogo Leninskogo Kommunisticheskogo soyuza molodezhi (for Zhuravlev).

(Science--Study and teaching)
(Siberia--Academy of Sciences of the U.S.S.R.)

SOBOLEV, S.L.; LYAPUNOV, A.A.

Mathematical problems in modern cybernetics. Izv. Sib. otd. AN SSSR
no.5:3-13 '62. (MIRA 18:2)

LYAPUNOV, A.A. (Novosibirsk); YABLONSKIY, S.V. Moskva)

Theoretical problems of cybernetics. Probl. kib. no.9:5-22 '63.

(MIRA 17:10)

ACCESSION NR: AT4016491.

S/2582/63/000/010/0179/0193

AUTHOR: Lyapunov, A. A. (Novosibirsk)

TITLE: The control system of living nature and the general concept of vital processes

SOURCE: Problemy* kibernetiki, no. 10, 1963, 179-193

TOPIC TAGS: cybernetics, control system, theoretical biology, living control system, homeostasis, mathematical model, structural control, statistical control

ABSTRACT: The purpose of the present article (read on June 2, 1962 at a conference dealing with philosophical problems of cybernetics in Moscow) is to propose a cybernetic approach to the study of the phenomena of life. In his introductory statement, the author notes that the physico-chemical trend in biology is aimed at uncovering the elementary vital processes and studying them from the physico-chemical point of view, while the cybernetic trend is directed at the elaboration of a general concept of vital phenomena, based on representations of the structure of organisms and of the elementary processes of life. The belief is advanced that a synthesis of these two directions will result in the creation of a unified system of theoretical biology. The opening sections of the paper are devoted to a delineation of the material covered, the precise statement or formulation of the

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problem and the derivation of the basic definitions. A distinction is drawn between empirical, theoretical and mathematical natural science. The cybernetic approach adopted by the author involves the study of the control systems of living nature and of the control process of vital activity. This approach, together with others (the biochemical or bioenergetic, for example), will permit the construction of mathematical models of living phenomena. The author therefore makes use of the system of precise concepts accepted in cybernetics and employs such notions as information, control system, signal, elementary act and communication channel in his treatment of the problem. The various states of matter are considered, along with those branches of natural science which deal with the study of these states. For the description of the particular state of matter, the author makes a selection of spatial and time scalar units and a certain set of physicochemical characteristics, paying special attention to the mean values and dispersion of the characteristics selected. The importance of the concept of stability is discussed, along with the notion of the "accompanying reaction". The author states: "Life may be characterized as a highly stable state of matter which makes use, for the purpose of giving rise to accompanying reactions, of information coded by the states of the individual molecules." In the second chapter of the report this definition of life is analyzed and the energetic cause of the relative stability of living organisms is investigated. Two fundamentally different methods of forming a higher control level are distinguished: the structural and the statistic. Some circumstances are

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considered which are, strictly speaking, beyond the sphere of biology and link that science with sociology. The evolution of the control systems is analyzed, with special attention to the problem of the differentiation of forms. In the third and final chapter, the author attempts to compare his definition of life with certain empirical data derived from biology and collects a number of well-known biological facts which tend to support, to one degree or another, the concepts advanced in the first two chapters of the paper. The processes of vital activity are considered, in this connection, on different levels: the molecular-biological, the cellular, the organismic, the populational and the evolutionary. The article closes with a brief discussion of certain possible trends in the practical utilization of knowledge accumulated with respect to the control systems of living nature.

ASSOCIATION: none

SUBMITTED: 28Apr62

DATE ACQ: 20Feb64

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SUB CODE: LS, IE

NO REF SOV: 000

OTHER: 000

Card 3/3

LIAPUNOV, A. A. [Lyapunov, A. A.]; I Ablonski, S. V. [Yablonskiy,
S. V.]

Theoretical problems of cybernetics. Fiz mat spisanie
BAN 6 no. 3:180-198 '63.

LYAPINOV, A.A. (Novosibirsk)

Totally additive vector functions. Part 3: A problem of
I.N. Ch. Neiman. ... Probl. kib. no.12:165-168 '64.

Totally additive vector functions. Part 4. Ibid.:169-179
(MIRA 18:6)

GLUSHKOV, V.M., otv. red.; KUKHTENKO, A.I., zam. otv. red.;
BLAGOVESHCHANSKIY, Yu.V., red.; DORODNITSYN, A.A., red.;
YERSHOV, A.P., red.; LYAPUNOV, A.A., red.; MOSKALEV,
I.S., red.; PUKHOV, G.Ye., red.; ROSTUNOV, T.I., red.;
SAMOKHVALOV, K.G., red.; STOJNIY, A.A., red.; TIMOFEYEV,
B.B., red.; SHCHERBAN', A.N., red.; LETICHEVSKIY, A.A.,
red.; KAPITONOVA, Yu.V., red.; MEL'NIK, T.S., red.

[Problems of theoretical cybernetics] Voprosy teoretiche-
skoi kibernetiki. Kiev, Naukova dumka, 1965. 209 p.
(MIRA 18:9)

1. Akademiya nauk URSR, Kiev.

ACC NR: AT6033084

SOURCE CODE: UR/2582/66/000/016/0147/0169

AUTHOR: Kulagina, O. B. (Moscow); Lyapunov, A. A. (Novosibirsk)

ORG: none

TITLE: On the problem of modeling an evolutionary process

SOURCE: Problemy kibernetiki, no. 16. Moscow, 1966, 147-169

TOPIC TAGS: mathematic model, genetics, biologic reproduction, binary code

ABSTRACT: A mathematical model of the evolution of a population of individuals, each with a different genotype, is described. The genotype is considered to be a set of genes each of which has two alleles, 1 and 0, i.e. the genotype is coded as a cortege of n digits with the values 0 and 1. A discrete space of genotypes is considered. The individuals in the population are numbered. Reproduction consists in the selection of pairs of individuals from the numbered set, following a specific numerical sequence, production of offspring, deletion of parents and the insertion of offspring in the vacancies thus formed or, if no vacancies are left, addition of offspring to the tag-end of the population. The complete cycle of the succession of generations is divided into the following stages: formation of parent pairs, formation

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ACC NR: AT6033084

of gametes, formation of zygotes, elimination of lethal genes, development of adults. This model can be used to investigate the effect of various mechanisms of selection in the course of evolution as a function of the degree of panmixia of the original population. Orig. art. has: 4 tables, 8 figures.

SUB CODE: 06, 12 / SUBM DATE: 30Jan65/ ORIG REF: 013

Card 2/2

VOL'PIN, P.I.; DEM'YANENKO, A.I.; ~~LYAPINOV, A.I.~~

Battery of continuously operating digesters with air blast
agitation. TSvet. met. 35 no.9:86-89 S '62. (MIRA 16:1)
(Aluminum--Metallurgy) (Hydrometallurgy)

LYAPUNOV, Aleksandr Mikhaylovich, akademik [deceased]; STETENSKIY,
L.N., otv. red. toma

[Collected works in five volumes] Sobranie sochineniy (v
piati tomakh). Moskva, Nauka. Vol.5. 1965. 494 p.
(MIRA 18:3)